DRAFT ENVIRONMENTAL ASSESSMENT

SAGE-GROUSE TRANSLOCATION

[Montana to Alberta]

December 14, 2010

A draft Environmental Assessment (EA) describing the proposed translocation of up to 40 sage-grouse from northeast Montana Region 6 to southeast Alberta with the primary intention of augmenting sage-grouse populations in silver sagebrush habitat.

Montana Fish, Wildlife & Parks

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PREFACE

Sage-grouse are a species of concern across much of their range, especially peripheral populations. Sage-grouse across Canada have declined 66 to 92% in abundance from 1970 population levels (Aldridge and Brigham 2003), with no sign of recovery in recent years. Alberta agreed with these estimates placing their sage-grouse declines at 80% over the same time period (Connelly et al. 2004). Historic sage-grouse declines are primarily attributed to habitat alteration and degradation (Schroeder et al. 2004). Other pressures such as energy and transportation infrastructure development are incrementally mounting, and degrading the suitability of remaining habitat in Alberta. Currently, subpopulations in both Alberta and Saskatchewan may have been reduced to below minimum viable size (Lungle and Pruss 2008).

Currently, Montana considers sage-grouse as both a Species of Concern and an upland game bird having stable populations. Undoubtedly, high densities of sage-grouse across Montana have provided a valid reason precluding listing, including the presence of at least two of North America's population strongholds (Connelly et al. 2004). One of these includes a high-density subpopulation between the Missouri River and the Milk River in Northern Montana.

The critical status of the silver sagebrush-associated sage-grouse populations warrants special attention by governments in the transboundary region of Alberta, Saskatchewan and Montana. All options available for recovery of the species are being considered. In particular, Alberta is seeking immediate efforts to ensure stochastic events and lag effects from past development (Holloran 2005) do not cause extirpation of sub-populations in the near term. In the longer term, population recovery will require a suite of actions and evaluations to determine success.

Alberta Sustainable Resource Development (ASRD), a ministry within the provincial government, has approached Montana Fish, Wildlife and Parks (MFWP) with a proposal to translocate up to 40 sage-grouse in year 1 from North Central Montana Region 6 to Southeast Alberta for the purpose of population augmentation. The proposal further requests to translocate up to 60 sage-grouse annually for the subsequent 3 years.

This EA outlines key background information procedures and effects of translocating up to 40 sage-grouse from Montana to Alberta. If this transplant is deemed successful, based on subsequent survival and reproductive success, then an EA proposing to transplant up to 60 additional sage-grouse annually for an additional three years will be prepared in the future. Based on minimum sage-grouse population estimates in Northern Montana, the proposed translocation would remove 0.26% (0.0026) of the sage-grouse population.

Chapter 1.0: Purpose of and Need for Action

1.1 Proposed Action

MFWP and ASRD propose to translocate up to 40 sage-grouse from North Central Montana Region 6 to Southeast Alberta in suitable sagebrush habitat.

1.2 Need for the Action

Sage-grouse are a species of concern across much of their range. Range-wide contractions in abundance and distribution have caused wildlife managers great concern over the past half century (Connelly and Braun 1997). Peripheral populations are faring poorly in many areas. A recent population review of the greater sage-grouse in Canada noted a decline of 66 to 92% in abundance from 1970 population levels (Figure 1; Aldridge and Brigham 2003), with no sign of recovery in recent years. Further reviews of the Alberta population agreed with these estimates placing declines at 80% over the same time period (Connelly et al. 2004). In response to these declines, the Alberta government 'blue listed' sage-grouse in 1996 as a species that may be at risk (Alberta Wildlife Management Division 1996), upgrading the listing to *endangered* under Alberta's Wildlife Act in 2000. Similar declines in distribution and abundance were noted in neighboring Saskatchewan leading to listings of potentially threatened in 1984, *threatened* in 1987 and *endangered* in 1999 (Lungle and Pruss 2008). Federally, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) listed sage-grouse as a *threatened* species in 1997 and *endangered* in 1998. In 2000, COSEWIC confirmed the listing as endangered and the species was listed under the federal *Species at Risk Act* in 2003 (Lungle and Pruss 2008). Population trend since these reviews remains negative (ASRD unpublished data).

In the United States, sage-grouse remain under the states' management and are federally considered a candidate species. On March 5, 2010, the U.S. Fish and Wildlife Service determined that the greater sage-grouse warrants protection under the Endangered Species Act, but that listing the species under the Act is precluded by the need to address other listing actions of a higher priority. Currently, Montana considers sage-grouse as both a Species of Concern and an upland game bird having stable populations. Undoubtedly, high densities of sage-grouse across Montana have provided a valid reason precluding listing, including the presence of at least two of North America's core breeding populations (Connelly et al. 2004). One of these includes a strong subpopulation between the Missouri River and the Milk River. Sage-grouse occurring north of the Milk River in predominantly silver sagebrush habitats remain at lower densities than sage-grouse south of the Milk River. Many areas north of the Milk River have also experienced a reduction of sage-grouse from historic distributions, including areas south of the Alberta and Saskatchewan boundaries. Some of these areas may still facilitate dispersal into or exchanges with Canadian populations, although it is likely that such movements have been greatly reduced (Bush et al. 2010). Small sub-populations in this region may be dependent on connectivity with larger core populations.

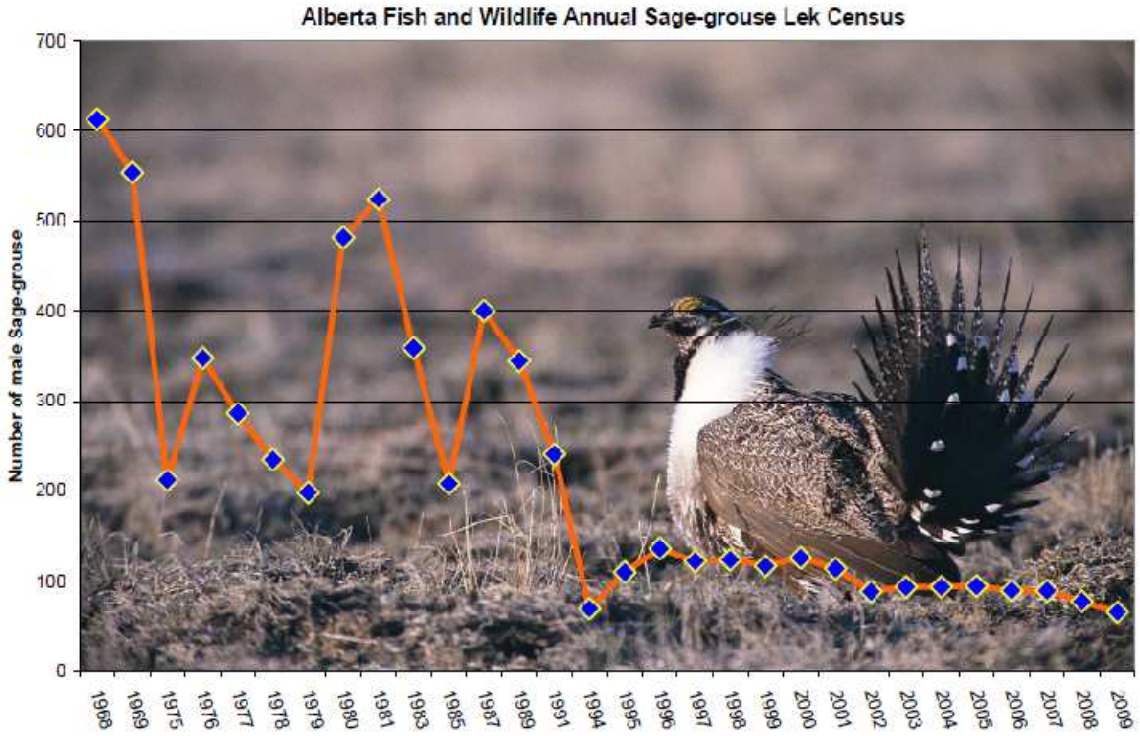

Figure 1 - Trend of strutting male attendance at Alberta sage-grouse leks 1968-2009.

Historic sage-grouse declines are primarily attributed to habitat alteration and degradation (Appendix1; Schroeder et al. 2004). In Alberta alone, original range contracted from approximately 49,000 km2 to what is now considered the Alberta sage-grouse recovery area: 4000 km2 centered south east of Manyberries (Aldridge and Brigham 2003, Alberta Sage-grouse Recovery Plan 2005). Although current cultivation pressures are limited in the Alberta Recovery area, past conversion to agricultural crops in the Northern Sagebrush Steppe (NSS) has reduced the distribution of sage-grouse in silver sagebrush habitats and has reduced connectivity between remaining patches (Bush et al. *In Press*) (Figure 2). Other pressures such as energy and transportation infrastructure development in combination with uncertain effects of climate change are incrementally mounting, degrading the suitability of remaining habitat. Added to these difficulties, the arrival of West-Nile virus in the region in 2003 had a substantial impact, decreasing late-summer survival of females by an estimated 25% for that year (Naugle et al. 2004). Currently, subpopulations in both Alberta and Saskatchewan may have been reduced to below minimum viable size (Lungle and Pruss 2008).

The critical status of the silver sagebrush-associated sub-populations warrants special attention by governments in the transboundary region of Alberta, Saskatchewan and Montana. All options available for recovery of the species need to be considered, including short to medium term actions, and across geographic scales. In particular, immediate efforts should strive to ensure stochastic events and lag effects from past development (Holloran 2005) do not cause extirpation of sub-populations in the near term. In the longer term, population recovery will require a suite of actions and evaluations to determine success. All actions should be evaluated through an adaptive

management approach, owing to uncertainty about the individual and combined causes of the decline. This environmental assessment outlines key background information and procedures for translocating sage-grouse in silver sagebrush habitats for the purpose of population augmentation.

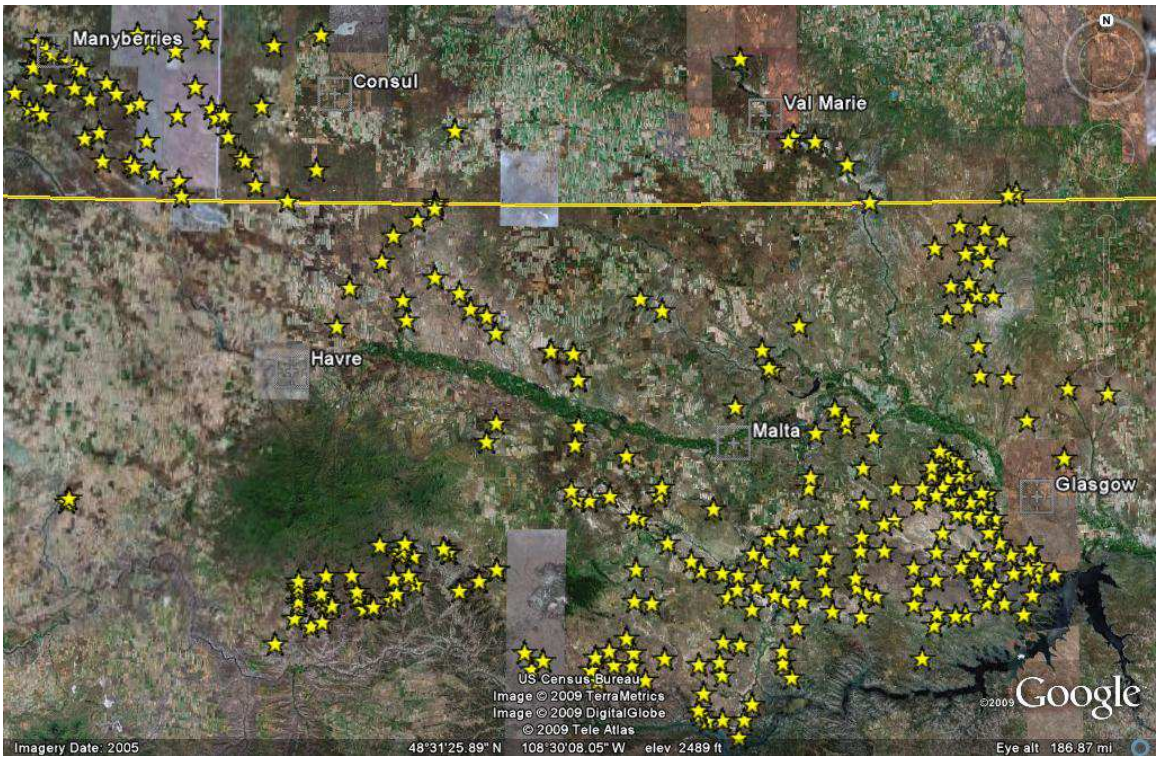

Figure 2 - Distribution of leks in the Northern Sagebrush Steppe including active leks in Montana and both active and inactive leks in Canadian jurisdictions. The juxtaposition of leks indicate where corridors linking population units are likely located.

1.3 Objectives of the Action (desired outcomes and conditions)

The goal of augmentation is to maintain or increase the current abundance and distribution of silver sagebrush dependent sage-grouse sub-populations in the Northern Sagebrush Steppe (NSS). Specifically, the objectives of the program are to:

1.3.1. Evaluate the potential for restoration measures to support maintenance or recovery of sub-population units prior to augmentation.

1.3.2. Increase knowledge of best practices for sage-grouse translocation in silver sagebrush ecosystems.

1.3.3. Evaluate the potential for augmentation to maintain or increase the number of sage-grouse associated with treated and adjacent leks in silver sagebrush ecosystems.

1.3.4. Coordinate augmentation with habitat restoration activities to achieve long term self sustaining sub-population units.

1.3.5. Develop a refined understanding of the spatial ecology of sage-grouse in the recovery area.

1.3.6. Collaborate with agencies, corporations and local communities to build awareness and increase support for sage-grouse conservation

1.3.7. Effectively communicate results of the project to the public through. information & education branches of relevant agencies and organizations.

1.3.8 The short-term measure of success of translocating 40 sage-grouse will be the expected 11-17 nests and 48-76 fledged sage-grouse in year 1 (see pages 14 & 24).

1.4 Relevant Plans, EISs, EAs, Regulations, and Authorities

1.4.1 Northern Sagebrush Steppe Greater Sage-grouse Recovery: Proposal for translocating sage-grouse into silver sagebrush communities in Alberta for population augmentation 2010

1.4.2 Alberta Sage-grouse Recovery Plan 2005

1.4.3 Management Plan and Conservation Strategies for Sage-grouse in Montana – Final 2005

1.5 Decision That Must Be Made

The decision to be made is whether MFWP should approve the translocation of up to 40 sage-grouse from South Valley and Phillips Counties to Southeast Alberta, or if the no action alternative should be chosen. This EA discloses the analysis and environmental consequences associated with implementing both of the alternatives and will provide information and analysis to determine whether an action results in a significant effect and would, therefore require the completion of an Environmental Impact Statement (EIS). If an EIS is not required, a Decision Notice will document the decision and rationale.

1.6 Applicable Permits, Licenses, and Other Consultation Requirements

1.6.1 Permits: A Scientific Collection permit is required by MFWP Permits from the US Department of Agriculture, Canadian Food Inspection Agency, and Alberta Sustainable Resource Development will be in place to facilitate export and import of sage-grouse. Approval of animal capture, handling and care protocols will be acquired from an approved Institutional Animal Care and Use Committee (IACUC)

1.6.2 Coordination Requirements: Coordination at the US/Canadian border is required to ensure the grouse are efficiently transported across the international border.

Chapter 2.0: Alternatives Including the Proposed Action

2.1 Introduction

The sage-grouse translocation project as proposed by MFWP and ASRD would provide for up to 40 individual sage-grouse to be translocated from Montana to Alberta. Sage-grouse for translocation will be obtained from one of Montana's two populations

strongholds, which is located north of the Missouri River but south of the Milk River, particularly in southern Valley and Phillips Counties.

2.2 Process Used to Develop the Alternatives

Sage-grouse source populations considered include populations in north, central, or east-interior Montana, with northern Montana being the most logical source population (Figure 3). Sage-grouse in these locations are genetically similar to sage-grouse in Alberta, have adequate abundances to draw from, and are within logistical proximity of the release site. Sage-grouse from all other populations are either genetically different from Alberta sage-grouse or have inadequate population abundances.

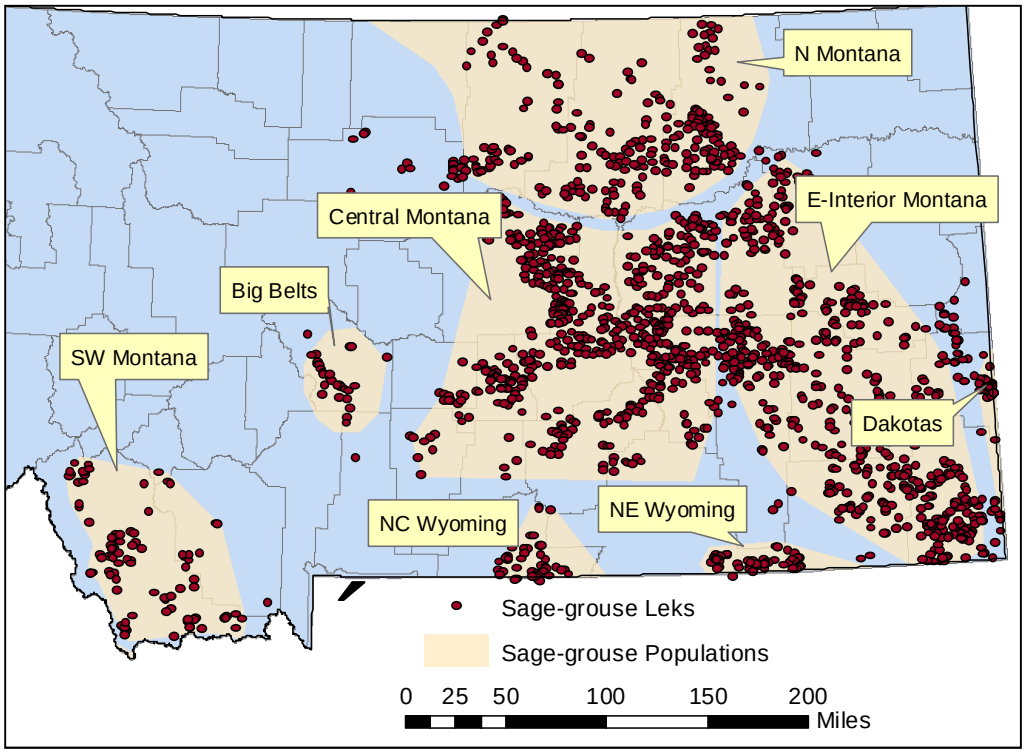

Figure 3. Sage-grouse population strong-holds in Montana considered in the alternatives.

2.2.1 History and Development Process of Alternatives

Schroeder et al., (2006) outlined the criteria that recipient jurisdictions should consider when selecting possible source populations for translocation. In particular, they suggested that source populations be:

1. Of the same species and subspecies;
2. Genetically, medically, and demographically healthy;
3. Translocated to similar habitat.

Other key considerations include the proximity of the source population to the release area, the presence of adequate populations, genetic management of the recovery population, ongoing cooperative management and research between jurisdictions, and agreements and/or MOU's that are

in place between donor and recipient jurisdictions (IUCN 1998, Schroder et al. 2006) (Figure 4 and 5). Table 1 provides a summary of possible source populations as described by Connelly et al., (2004), Oyler-McCance et al., (2005), and Bush et al., (2010), with respect to the above criteria.

Table 1: Comparison of desirable attributes between possible source populations as defined by Connelly et al., (2004). Key responses that negate the source population are highlighted.

Population	Similar Habitat	Proximity (Manyberries to source in Kilometers)	Adequate Population	Same Genetic Cluster	Western Governors' Association	Northern Sage Steppe Initiative	WAFWA Sage-grouse Recovery
North Montana	Yes	333	Yes	Yes	Yes	Yes - Focus	Yes
Central Montana	No	526	Yes	Yes	Yes	Yes	Yes
E-Interior Montana	No	870	Yes	Yes	Yes	Yes	Yes
Belt Mtn. Montana	No	575	**NO**	NA	Yes	Yes	Yes
Southwest Montana	No	660	Yes	**NO**	Yes	Yes	Yes
Northeast Wyoming	No	1075	Yes	**NO**	Yes	No	Yes
N-Central Wyoming	No	900	Yes	**NO**	Yes	No	Yes
Dakotas	Yes	1100	**NO**	**NO**	Yes	No	Yes
Idaho	No	850	Yes	**NO**	Yes	No	Yes
NOTE:	***1***	***2***	***3***	***4***	***5***	***5***	***5***

1. Similar habitat is considered use of silver sagebrush communities;
2. Proximity is the distance between Manyberries, Alberta and a source population median;
3. Adequate populations are based on Connelly et al., (2004);
4. Genetic cluster is based on analysis presented in Figures 4-5, Oyler-McCance et al., (2005), and Bush et al., (In Press);
5. Membership in the aforementioned co-management and collaboration MOU's.

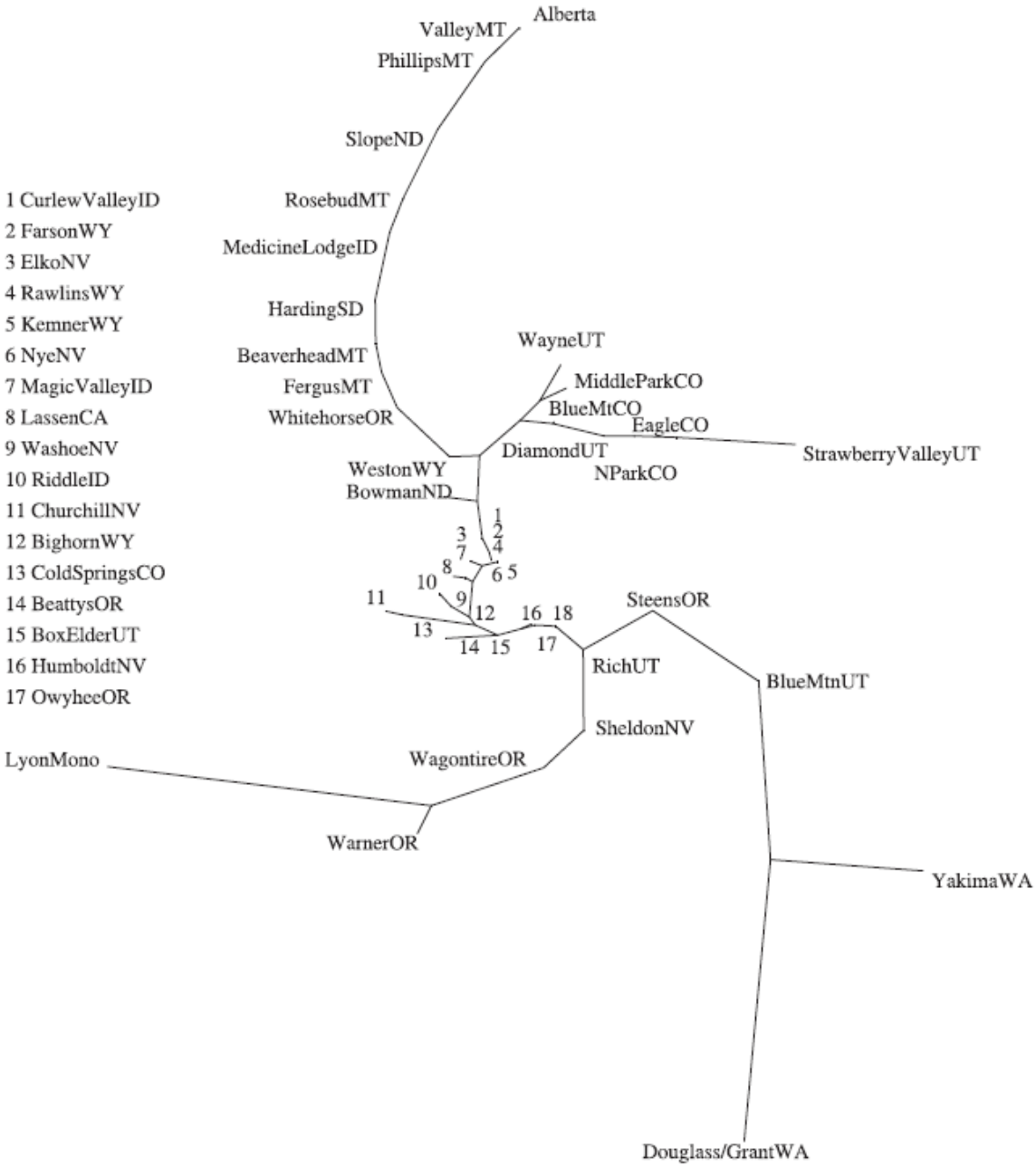

Figure 4: Genetic distance using a neighbor-joining tree where longer lines represent greater genetic distance. Alberta subpopulations are most similar to sage-grouse in Valley and Phillips Counties in northern Montana (From Oyler-McCance et al., 2005).

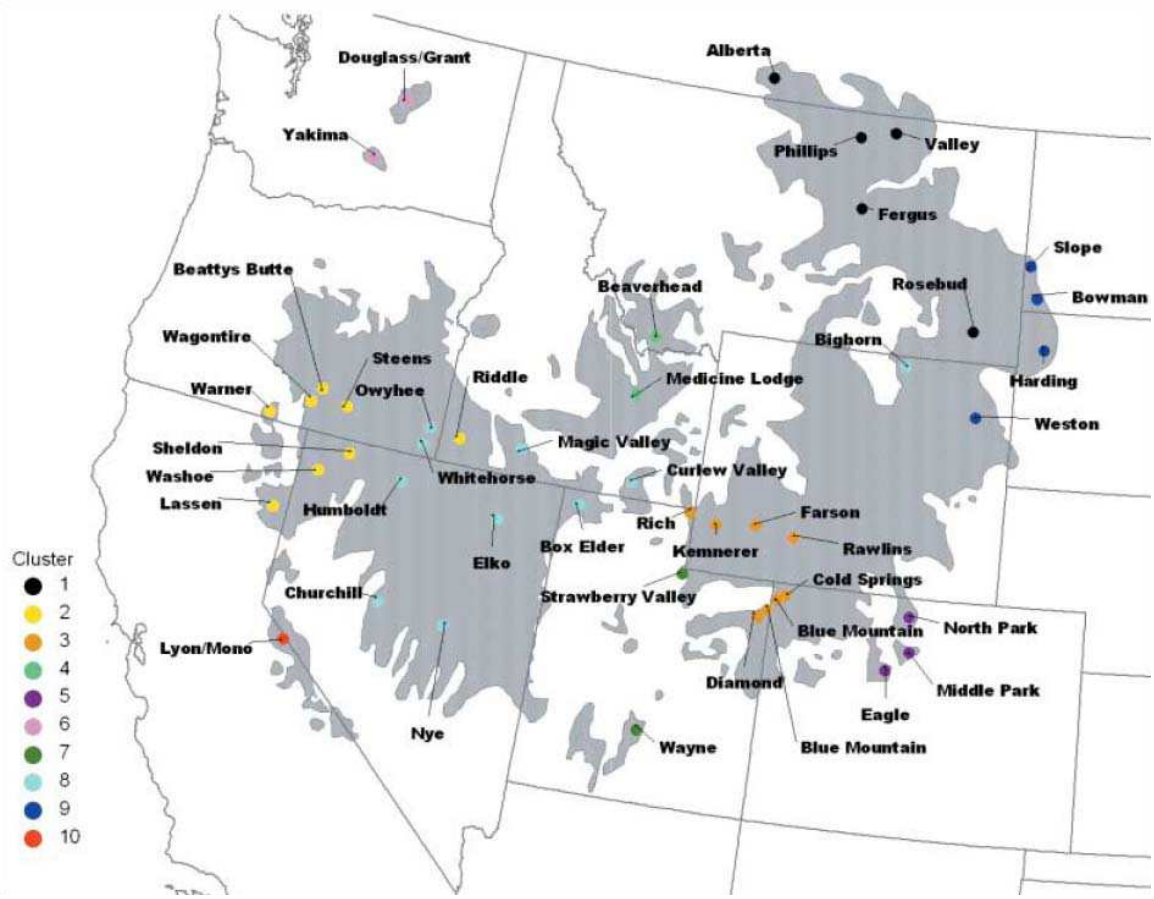

Figure 5: Distribution of sage-grouse populations based on colored cluster points and the origin of samples of Figure 4 (From Oyler-McCance et al. 2005).

Montana appears to be the most logical source as populations are close, appear to be healthy, and with the exception of its southwest population, are genetically similar. The state is also a member of all three inter-jurisdictional MOU's. Collaboration with Montana would provide an excellent example for implementing all three MOU's, in particular the newly drafted WGA resolution and NSSI. Central and northern Montana appear to rank the highest of all choices. Central Montana would be slightly further than northern Montana pending the choice of trapping locations. Eastern-Interior Montana would be further still, although retaining similar genetic structure to the recovery population. All other options appear less likely as they either do not contain sufficient populations, are genetically different, or are too far from the augmentation sites.

2.2.2 Alternatives Eliminated from Detailed Study

The following sage-grouse populations were considered for source populations but were eliminated because they do not meet the three criteria set forth by Schroder et al., (2006):

1. The Idaho population is genetically dissimilar, and does not occupy similar habitat.
2. The Dakotas' population does not have adequate population size, and is genetically dissimilar.
3. The North Central Wyoming population is genetically dissimilar, and does not occupy similar habitat.
4. The Northeast Wyoming population is genetically dissimilar, and does not occupy similar habitat.
5. The Southwest Montana population is genetically dissimilar, and does not occupy similar habitat.
6. The Belt Mountains Montana population does not have adequate population size, and does not occupy similar habitat.
7. The East-Interior Montana population does not occupy similar habitat.
8. The Central Montana population is further from Alberta and there is not the working relationship between ASRD and MFWP personnel.

2.3 Description of Alternatives

This EA evaluates two project alternatives in detail. These include Alternative A, the No Action Alternative (Section 2.3.1) and Alternative B, the Southern Valley and Phillips Counties Sage-grouse Translocation Alternative (Section 2.3.2).

2.3.1 Alternative A: The No Action Alternative

The No Action Alternative means that no sage-grouse would be captured and translocated from private lands and public lands managed by the BLM and DNRC in southern Valley and Phillips Counties. The environmental impacts and benefits as described in this EA (see Chapter 3) would not occur.

2.3.2 Alternative B: The Southern Valley and Phillips Counties Sage-grouse Translocation Alternative

Alternative B would provide up to 40 individual sage-grouse to be translocated from Montana to Alberta. Source populations for the project will include obtaining sage-grouse from one of Montana's two population strongholds, specifically the subpopulation located north of the Missouri River but south of the Milk River, in southern Valley and Phillips Counties.

Capture Location

Within the South Valley and Phillip County area, six sage-grouse lek complexes have been identified (Figure 6). Lek complexes were formed by grouping leks geographically, ease of accessibility and habitat similarities. Of the lek complexes, the Beaver Cr. complex in Phillips County and the Larb Creek, Bentonite, and Willow Cr. complexes in Valley County are the most appropriate capture locations. These complexes are easily accessible and contain ample numbers of active leks. Furthermore, leks within these complexes are regularly monitored and exhibit stable sage-grouse population levels. Coordination with the respective public land management agency(s); or permission from private landowner(s) is crucial to accessing any sage-grouse leks.

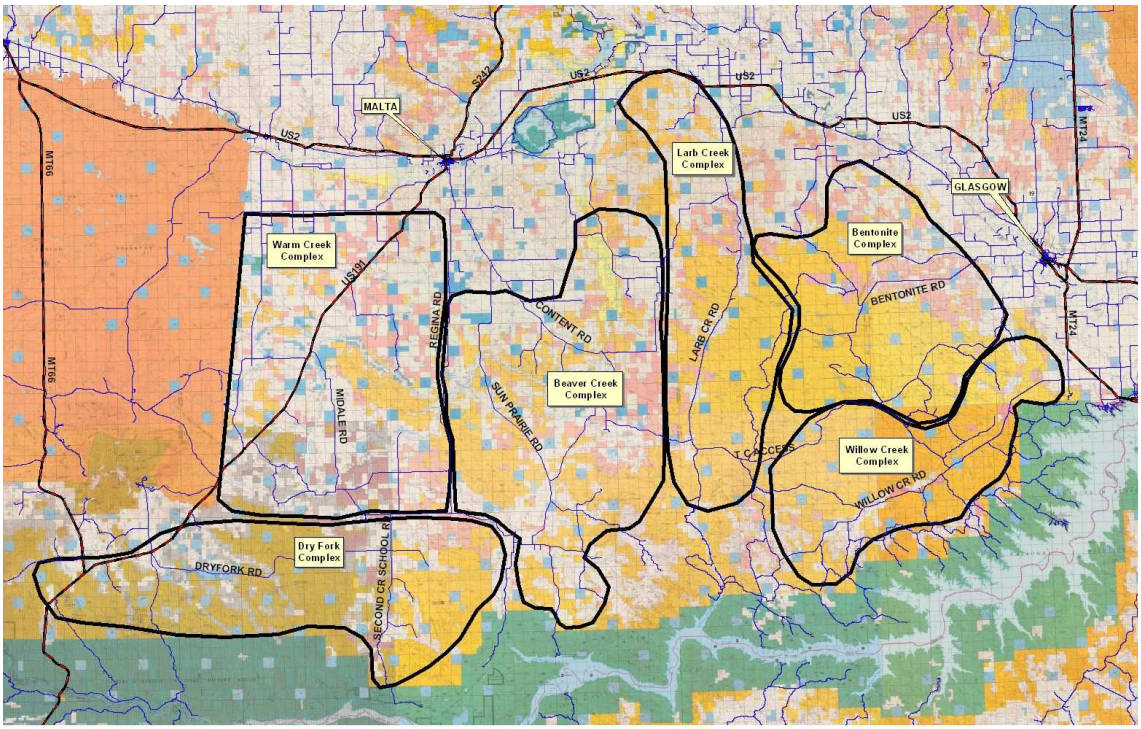

Figure 6. Sage-grouse lek complexes in south Valley and Phillips Counties.

Capture Numbers

Captures would occur in the spring of 2011, targeting up to 40 sage-grouse for translocation. Female sage-grouse will be preferred for the translocation as the augmentation is attempting to increase populations rather than manage genetics (Schroeder et al. 2007a).

Using expected survival, nesting, and 20 recruitment values presented by Aldridge (2002) and Baxter et al., (2008), the translocation of this number of grouse is expected to provide 11-17 nests, 48-76 fledged grouse, and approximately the same number of grouse (i.e. 40) entering the breeding period in year 2. A higher rate of nesting in overwintering grouse is expected, and 15-22 nests is expected from this initial group of

translocated grouse and their offspring in year 2. Any increases in sage-grouse abundance from recruitment would be detected in year 3 of the program.

The numbers above would provide an estimate of success. Success of proposed objectives as measured by the integration of translocated sage-grouse with local grouse, desired vital rates, and abundance indices would require a multi-year effort to improve the probabilities of achieving adequate sample size in subsequent years of monitoring. If this transplant is deemed successful, based on survival and reproductive success after year 1, then an EA proposing to transplant additional birds will be submitted in the future.

Capture Timing

Capture efforts will be focused during the spring breeding period (late March and early April; Figure 7) which is considered the best period to capture and translocate sage-grouse (Musil et al. 1993, Reese and Connelly 1997, Baxter et al. 2008). Spring captures are advantageous because sage-grouse hens are concentrated near leks and when transported to Alberta and released near leks they may be attracted to displaying males for breeding. Although captures will occur throughout the breeding period, captures will be focused in the latter three quarters of breeding. This will enhance the probability of hens nesting near the release sites which should anchor hens to an area, reducing mortality and increasing recruitment (Coates and Delehanty 2006).

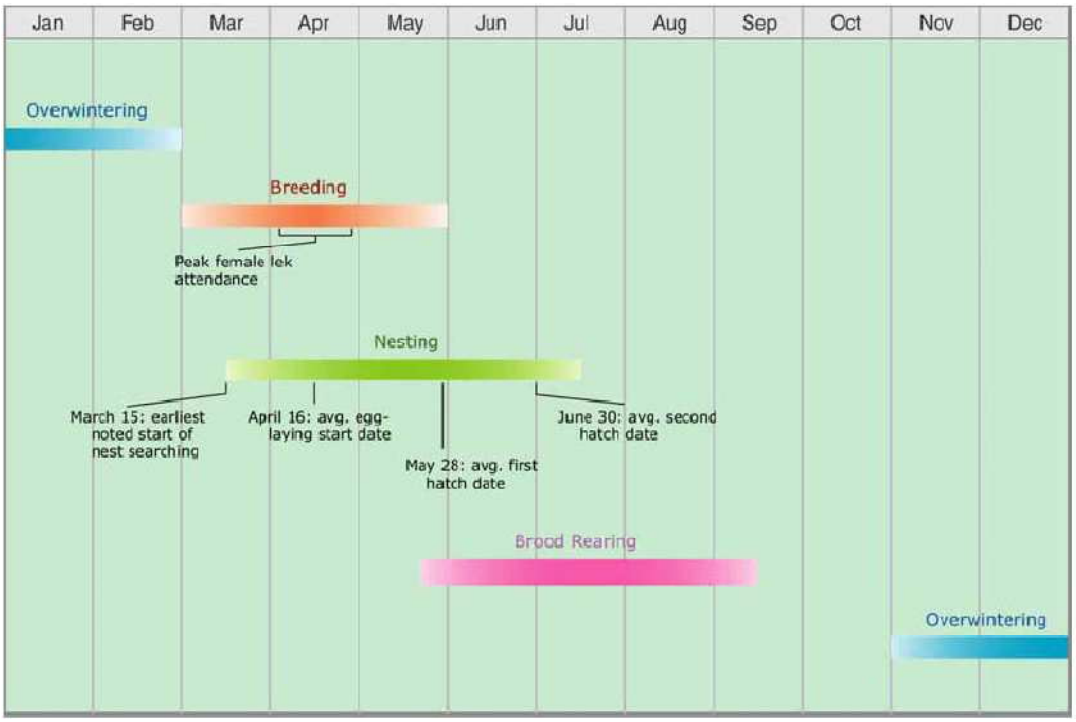

Figure 7. Annual life cycle of sage-grouse (Alberta Sage-grouse Recovery Plan 2005).

Capture Methods

To date, most efforts have used spotlighting as the primary mechanism to capture sage-grouse (Aldridge 2002, Kaiser 2006, Schroeder et al. 2007, Baxter et al. 2008, Beckstrand 2009), although rocket-netting has been used in some instances (Giesen et al. 1982, Moynahan et al. 2006, Doherty et al. 2008). Giesen et al. (1982) compared spotlight trapping and rocket-nets, finding the former to be far more efficient, although time of year did play a role in success. For example, they found rocket-netting to be successful in capturing hens with broods in late summer and found spotlighting to be most successful year round with highest successes during the breeding season. Moynahan et al., (2006) used rocket-nets successfully on lekking sage-grouse in northern Montana.

Some capture operations have employed both methods (Moynahan et al. 2006, Doherty et al. 2008), finding success to vary between capture area based on vegetation characteristics and sage-grouse density. Rocket-netting and spot-lighting will be used in capture areas until the most effective approach is determined for each site.

Transporting

Once captured, sage-grouse will be placed in individual containers and taken to a central location where they will be processed. Captured individuals will be assessed as described by Wallestad (1975), and fitted with numbered leg bands and a necklace or backpack style GPS transmitter. Complete handling details are found in Appendix 3. Invasive testing and sampling will be completed by qualified staff (Appendix 4). Processed sage-grouse will then be shipped to the release site. Permits from the US Department of Agriculture, Canadian Food Inspection Agency, Montana Fish Wildlife and Parks, and Alberta Sustainable Resource Development will be in place to facilitate export and import of sage-grouse (Appendix 5).

Logistics will be organized with ASRD staff and others to transport sage-grouse across the international boundary in a timely fashion. Travel to access the 24 hour border crossing should be considered. Alternatively, the most convenient border station (i.e., Wild Horse) would be accessed, although this crossing would only be open between 800-1700hrs. Transportation time will need to be considered in relation to total holding time.

Reducing holding time of sage-grouse by several hours may translate to increased survival of translocated sage-grouse. However, safety considerations for staff and familiarity with border staff should also factor into choosing which location would best meet translocation needs. Unfortunately, if sage-grouse are to be released during strutting activities early morning, this would mean a holding time of approximately 26-30 hours. However given the location of 24 hour border crossings, the most

likely alternative for most capture efforts would entail holding grouse several hours longer than this. Either situation would result in holding times less than the 60-70 hour maximum holding time reported by Thompson (1946; in Reese and Connelly 1997), meaning tradeoffs between logistics and decreased holding time will need to be made, on an area specific basis.

Release

Once at release sites, sage-grouse will be released near known locations of resident sage-grouse. Transport containers will be positioned near (~200 to 400 meters) active strutting grounds an hour before resident sage-grouse arrive on the lek. Containers will ideally be positioned downwind from leks and directed away from the sun. Both measures will increase the potential for captive sage-grouse to detect the location of strutting sage-grouse. Captive sage-grouse will be allowed a half hour of acclimatization to strutting and calling sage-grouse before being released in small flocks of approximately 6 to 10 through use of a remote mechanism (e.g., a string). Prior to release, all members of the release party will vigilantly scan for avian or terrestrial predators to reduce predation effects (Baxter et al. 2008).

Monitoring and Evaluation

Because translocation of sage-grouse is largely experimental, this effort will be considered an adaptive management experiment. As with any adaptive management experiment, monitoring and evaluation will play a key role in the program (Table 2).

Evaluation will begin with the capture of sage-grouse and will be part of a long term strategy to determine success and to modify techniques as needed. The intensiveness (labor and monetary) and statistical requirements of the evaluation and monitoring will determine the duration of each component. In particular, each evaluation component of the project objectives outlined in Section 1.3 will be addressed, however other research questions that arise may be addressed if determined to be feasible. A selection of useful topics is presented in Table 2 and brief outlines of several monitoring and research studies that would be companion to any translocation effort are provided. Individual detailed methods will be prepared prior to any augmentation for proposed research projects.

Table 2 - An example of research categories and associated topics that could be addressed during and after the augmentation effort.

Population Demographics	Movement and Migration	Habitat and Space Use	Disease and Health Issues	Translocation Techniques
Survival	Dispersal	Seasonal Home Range Use	Parasite Load	Capture date and nest success
Mortality	Behavioral Adaptation	Seasonal Habitat Use and Selection	West-Nile Virus Sero-prevalence	Hydration Supplementation
Nest Success	Integration with Resident Grouse	Habitat Source Sink Dynamics		Capture and Release Technique
Brood Success	Movement Corridors	Effectiveness of Reclamation		Age Ratio Success

The effect of augmentation on maintaining or increasing the number of sage-grouse on treated and adjacent leks will be determined through regular lek counts using existing standardized protocols. Lek counts were employed irregularly in the recovery area prior to 1997 and since then annually to determine short, medium, and long term abundance trend. Continuing this effort would facilitate trend analysis of strutting males, providing an assessment of sage-grouse distribution and abundance in the recovery area over time. The utility of counts is that they can be compared to infrastructure changes (e.g., well reclamation, operational changes) over time in a manner similar to Holloran (2005) to help determine the success or failure of restoration activities on sage-grouse abundance and distribution. For example, questions could be addressed such as: do restoration efforts correlate to increases in abundance and distribution; or how long of a lag between activities is required before marked increases in either? As Alberta uses a relatively standardized approach that is consistent with other jurisdictions, macro-analysis such as `that presented in Connelly et al., (2004) at a range wide scale are possible leading to increased collaboration.

Monitoring will continue in the source area to determine the impact, if any, of removing sage-grouse. Continued monitoring will provide a comparison of sage-grouse trends between leks where sage-grouse have been removed and leks with no removal. Additionally, sage-grouse leks in the source area have historical data and can provide trend data over time with and without removal.

A last series of research questions will address the spatial ecology of sage-grouse in the recovery area including the following 6 overarching questions:

1. Are translocated sage-grouse integrating with resident sage-grouse?

2. Which age cohort of translocated female sage-grouse show the highest degree of fidelity and does this translate to higher survival and reproduction?
3. What habitats are selected seasonally and what is the influence of restored habitats on movements?
4. Which habitats require restoration based on avoidance, survival and reproduction?
5. How does reproduction and survival compare to baseline conditions?
6. How connected are sage-grouse sub-population units in the NSS?

Chapter 3.0: Affected Environment & Predicted Environmental Consequences

3.1 Introduction

Section 3 describes the physical, biological, and human resources of the environment that may be affected by the alternatives presented in the previous section and the environmental effects that the alternatives may have on those resources. Affected environment and environmental consequences have been combined into one chapter to provide a more concise and connected depiction of what resources exist in the project area that are directly associated with the proposed action.

3.2 Description of Relevant Pre-Existing Factors

3.2.1 Pre-existing factors in Montana's South Valley/Phillips core sage-grouse area

Over the last 5 years (2006-2010) 145 sage-grouse leks have been monitored across Valley and Phillips Counties. Not all leks are surveyed annually. Because of this, it is necessary to use a block of survey years to estimate a minimum average population size.

- The total average high male count for the surveyed leks was 3,857 male sage-grouse.
- Braun (2002) estimated 75% of males are counted on leks. Dividing the above number by .75 provides a minimum spring male estimate of 5,143 male sage-grouse
- Braun (2002) estimated that for larger sage-grouse populations (>300 males counted on > 20 active leks each spring), there would be 2 hens per male in the spring. That provides a spring hen estimate of 10,285 hen sage-grouse.
- The total estimated spring population based on male attendance of surveyed leks is a minimum of 15,428 sage-grouse in Valley and Phillips Counties.

Sage-grouse populations in the identified Montana source area are determined to be stable. Counting males on all leks in a 100 square mile block in Valley County provides an additional measure of trend in the

source area.. In 2010 a total of 301 male sage-grouse were observed, which is 37% above the long-term average (1989-2010, 220) and 18% above the last 10-year average (256). The number of males per lek averages 27 over the last 10 years (Figure 8).

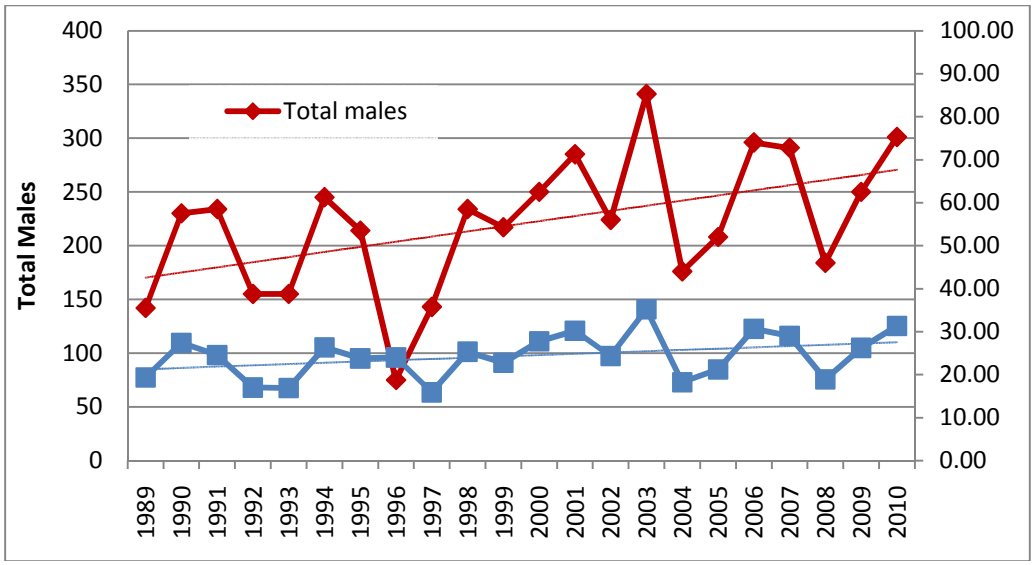

Figure 8. Sage-grouse male counts on the Valley Co. block

Twenty-five leks in Region 6 serve as Adaptive Harvest Management (AHM) leks that are used to evaluate annual population trends for setting sage-grouse hunting seasons (Montana Sage-grouse Management Plan 2005). Some of the Valley county block leks are included in the AHM lek list with additional leks in Phillips, Blaine and McCone Counties. Twenty-one of those leks are located in South Valley and Phillips Counties. Data from these leks are comparable only for the last 5 years due to inconsistent past monitoring effort. Number of males per lek averages 37.6 over the last 5 years (Figure 9).

Sage-grouse habitat in the proposed source area is dominated by Wyoming big sagebrush with silver sagebrush in riparian areas. The area defined as a sage-grouse core area is centered in South Valley and south Phillips Counties and encompasses approximately 5,180 km^2 (2,000 m^2, Figure 10).

Sage-grouse habitat in the South Valley/Phillips area is in generally good condition primarily due to maintaining large tracts of big sagebrush habitat. Livestock ranching is the predominant land use in this area, which has conserved large blocks of native sagebrush grassland habitat on private and public lands. Additionally, past and future expectations for oil and gas exploration is minimal, further maintaining continuous sagebrush habitat.

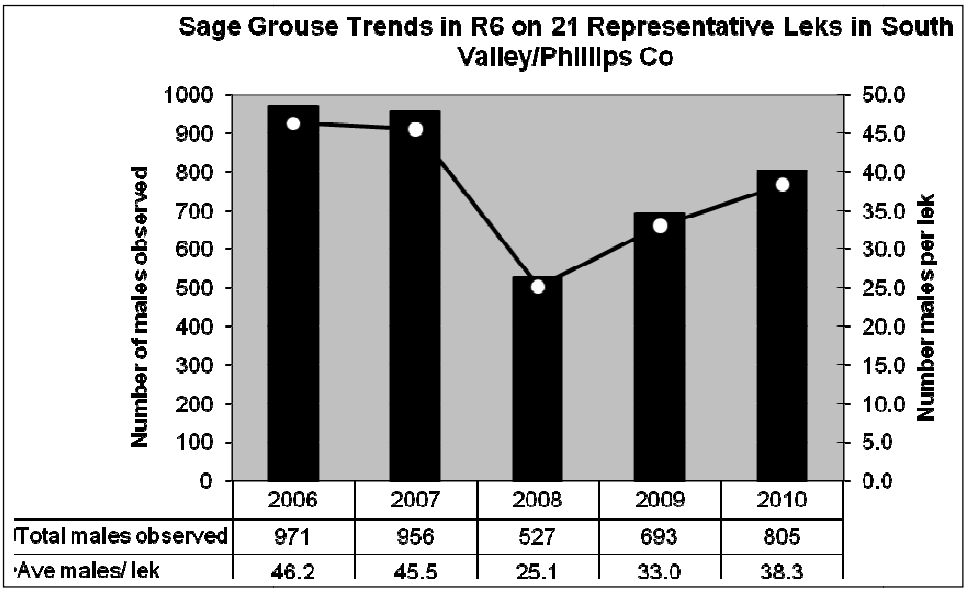

Figure 9. Sage-grouse male counts on 21 AHM leks in South Valley/Phillips Co.

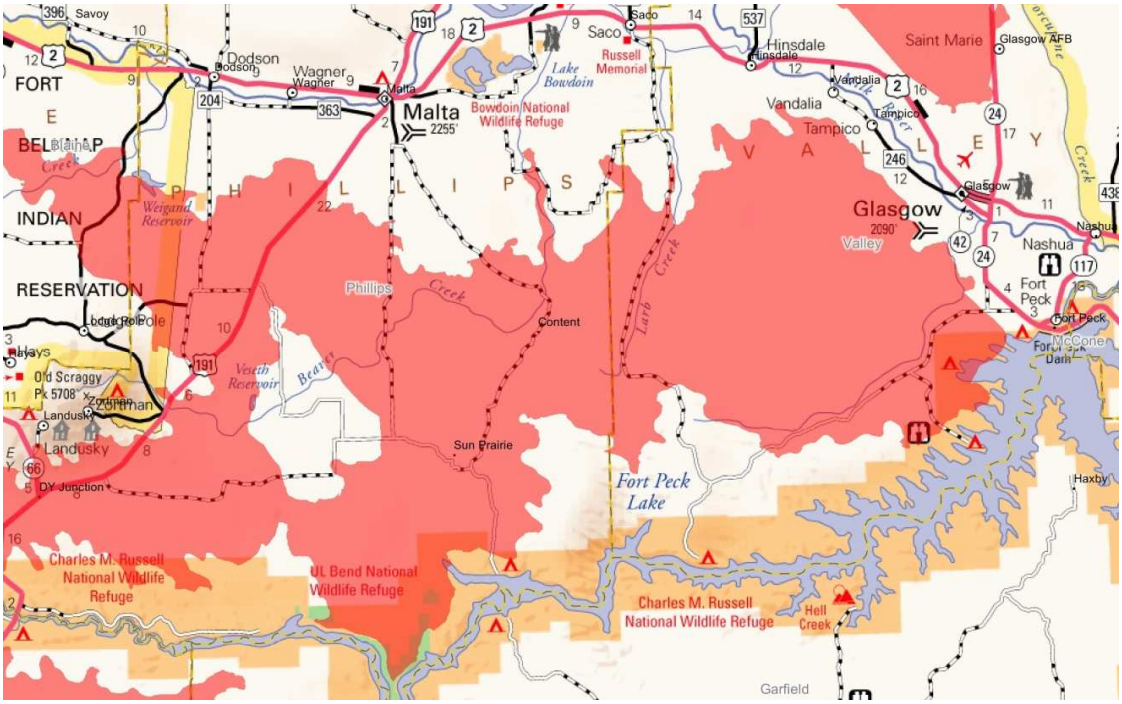

Figure 10. South Valley/Phillips sage-grouse core area designated with red overlay.

3.2.2 Pre-existing factor in southeast Alberta's sage-grouse habitat

Existing population trends: Historically sage-grouse in Alberta occupied silver sagebrush habitats bounded by Empress and Saskatchewan Landing in the north, and Lethbridge in the west (Figure 11). More recently, sage-grouse have been limited to sagebrush habitat within a ~4000 km^2 area in the far southeast corner of the province, south of the Cypress Hills and

east of Pakowki Lake. This will be the area considered for all current augmentation efforts proposed herein.

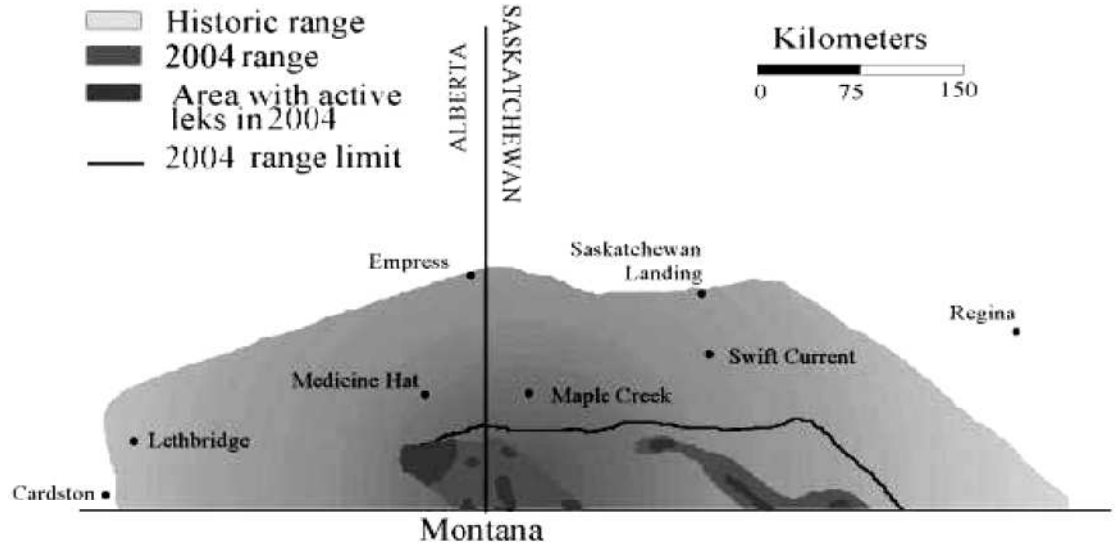

Figure 11. Historic and current distribution of sage-grouse in Alberta and neighboring Saskatchewan (Alberta Sage-grouse Recovery Plan 2005).

Because of this historic loss of habitat combined with current threats (see Appendix 1 for a review of past, current, and future threats), Alberta's sage-grouse have undergone declines in abundance of 66 to 92% from 1970 population levels (Aldridge and Brigham 2003), with no sign of recovery in recent years. Concerted efforts over the past 12 years focused on counting strutting males and found a maximum of 35 on a single lek in 1999 and a mean of 13.3 across all leks considered to be active during this entire period. In 2009 a maximum of 11 males were observed on a single lek. These values when considered with long-term trend data (Figure 1) and reduction in range (Figure 11) denote an obvious decline in Alberta's sage-grouse population. The downward trend can probably be attributed to pressures as outlined in Appendix 1 and due to small population size effects. Primary concerns where management actions will play a key role are the impacts of industrial activities (e.g., auditory, direct loss of habitat, fragmentation effects), grazing management (e.g, appropriate range conditions, forb development, avoiding conflicts with cross-fencing and watering), and land use (e.g. maintaining native component, reclaiming converted lands). Predation on nests and brooding hens could also prove substantial (Beckstrand et al. 2009). Although predator control has been successful in facilitating augmentation (Baxter et al. 2008), other research has demonstrated that the effects on sage-grouse may be exacerbated by coyote control (Mequida et al. 2006) and in many cases predation rates by some species on nests may not be as substantial as once thought (Michener 2005). Predator control in general has been found to be less than successful (Reese and Connelly 1997), especially in areas where predator

immigration is challenging to control (e.g. open prairie environments). As such, predation on relocated sage-grouse and their broods will be monitored and results integrated into an adaptive management framework.

3.3 Relevant Resource #1- Sage-grouse population effects in South Valley/Phillips core area

3.3.1 Effects of Alternative A: No translocation (No Action)

- Direct Effects: No action will result in no short-term reduction in the adult sage-grouse population immediately around source leks. No potential population reductions due to removal of sage-grouse hens and their subsequent broods will occur.
- Indirect Effects: No action would result in no disturbance on sage-grouse leks. There will be no effect on the nesting success of hens being bred on those leks.

3.3.2 Effects of Alternative B: The Southern Valley and Phillips Counties Sage-grouse Translocation Alternative

- Direct Effects: The translocation would remove up to 40 sage-grouse subsequent broods of hens from South Valley/Phillips core area. Based on population estimates discussed in 3.2.1, this would remove 0.39% (0.0039) of the estimated hen population and 0.26% (0.0026) of the total estimated sage-grouse population in Valley and Phillips Counties. Furthermore, this level of removal is significantly less than what is removed through regulated fall hunting in the area. Between 1998 and 2008, Valley and Phillips Counties averaged a harvest of 838 sage-grouse annually. Removal of up to 40 sage-grouse is expected to have minimal short-term effects and have no population level effects.

- Indirect Effects: Increased disturbance on source leks would likely increase stress on non-captured hens and may reduce breeding success and subsequent nesting success of those hens. However, these effects are expected to be minimal and have no population level effects.

3.4 Relevant Resource #2 - Sage-grouse population effects in silver sage brush habitat north of the Milk River in Montana and Alberta

3.4.1 Effects of Alternative A: No translocation (No Action)

- Direct Effects: Not augmenting the Alberta sage-grouse population would make conserving and restoring limiting habitat features in Southeast Alberta the sole method of attempting to reverse the declining trend of sage-grouse numbers.

- Indirect Effects: Sage-grouse are known to migrate between northern populations north of the Milk River to points south of the Milk River (Tack 2009). The no action alternative will not change or have any effect on the natural trend that is occurring with sage-grouse dispersal and migration between Northern Montana and Alberta.

3.4.2 Effects of Alternative B: The Southern Valley and Phillips Counties Sage-grouse Translocation Alternative (Proposed Action)

- Direct Effects: Using expected survival, nesting, and 20 recruitment values presented by Aldridge and Brigham (2002) and Baxter et al., (2008) the translocation of this number of grouse would be anticipated to provide 11-17 nests, 48-76 fledged grouse, and approximately the same number of grouse (i.e. 40) entering the breeding period in year 2. A higher rate of nesting in overwintering grouse would be anticipated (Baxter et al. 2008), and 15-22 nests would be expected from this initial group of translocated grouse and their offspring in year 2. Any increases in sage-grouse abundance from recruitment would be detected in year 3 of the program.
- Indirect Effects: There is increased potential for sage-grouse dispersal and migration between Northern Montana and Alberta; as well as maintaining connectivity between the sage-grouse populations.

3.5 Relevant Resource #3 - How habitat constraints in Alberta are being addressed to improve their suitability for sage-grouse habitat.

Decreased effectiveness of remaining habitat and energy activity projections
Although habitat in the recovery area exists in what appears to be quantities appropriate for recovery, the effectiveness of these habitats to maintain sage-grouse populations have decreased over the last number of years (Aldridge and Boyce 2007). Decreases can be attributed to several sources (Appendix 1) although recent research has increasingly indicated the negative correlation between energy and extraction activities, and sage-grouse abundance and distribution. Doherty et al., (2008) and Kaiser (2006) found sage-grouse avoided infrastructure associated with energy extraction activities during various seasons, while more direct decreases in survival were noted by Holloran (2005), and Aldridge and Boyce (2007). Naugle et al., (*In Press*) reviewed range-wide impacts of oil and gas development and found abandonment of leks by both female and male yearlings. Their review also highlighted decreases in female survival, that when combined with yearling abandonment resulted in 3-4 year population lag effects from development. Habitats in Alberta have been greatly impacted by these same developments. A recent analysis by Chapman (2008) found mean densities of 1.7 producing wells per km^2 and 4.6 per km^2 for all wells (producing, reclamation exempt, reclaimed, abandoned) within 3.2 km of known lek locations in Alberta. Leks still considered active as of 2008 had well densities of 1.2 and 3.9 per km^2 respectively. The past proliferation of well locations in the Alberta recovery area has been indicated in reductions of brood survival (Aldridge and Boyce 2007).

Other energy extraction activities such as the construction and operation of wind power facilities including high tension power transmission and electric distribution lines appear to influence sage-grouse populations negatively (Connelly et al. 2000, Pruett et al. 2009). Alberta Fish and Wildlife is currently using an adopted approach from Montana (Kiesecker et al. 2010) to map out areas of concern for several species including sage-grouse using species' critical habitat maps. This analysis will be used to identify areas where wind development is appropriate given concern over several sensitive species. At present, there are no formal plans for wind development within the current sage-grouse distribution. Current policy within Alberta Public Lands management does not permit wind development on public lands, which comprise the majority of the recovery area.

Clearly, current and future development of energy resources will have a vital role in determining the success of any recovery effort. In particular, research presented above often indicated an increase in anthropogenic edge associated with development as a key factor. To determine future landscape scenarios based on energy activities, the Alberta Sage-grouse Recovery Action Group recommended a study to determine the quantities of effective habitat that might be available to sage-grouse over the next 50 years. To complete this task, Chernoff et al., (2008) assessed the impacts of projected land uses on key variables important to sage-grouse. Findings revealed that direct habitat losses would likely be very small relative to the recovery area. Likewise, model projections showed declining quantities of anthropogenic edge, even if projected conventional oil and gas drilling activities were to increase threefold from projected horizons. Worst case scenarios (4-5 times expected activity) placed declining edge quantities at 10-15 years. Models using these horizons combined with the anticipated lifespan of infrastructure found that even with a doubling of expected lifespan, the amount of effective habitat for sage-grouse should increase immediately and persistently. Even a tripling of the lifespan of infrastructure based on current model projections, would result in a net gain of effective habitat over a 50 year time frame. Essentially, even though energy development has had a negative impact on sage-grouse habitat, estimates using a doubling and possibly a tripling of projected growth found an apex in development has been reached and the amount of effective habitat will begin to increase immediately within the Alberta recovery area.

Guidance for restoration efforts

While it is difficult to project where decreasing future energy plays may be located (i.e., exact location of wells and supporting infrastructure), identification of critical habitats and areas requiring action are possible. To do this, several steps have been taken to identify locations that are priorities. As part of the Canadian Sage-grouse Recovery Strategy, a technical group has recently completed an extrapolation of nest models developed by Aldridge and Boyce (2007) for the Canadian recovery area, which is inclusive of the entire Alberta recovery area (Appendix 2). The habitat model predicts the relative probability of use for sage-grouse nesting and brooding habitat. The model allows managers to determine the juxtaposition of critical habitats that should be conducive to high recruitment. Given that low recruitment appears to be a problem for Alberta sage-grouse (Aldridge and Brigham 2001), identifying key source habitats that

will be given adequate protection is a priority. Concurrently, analysis of existing developments in relation to critical habitats will guide restoration activities.

Decisions on management actions will be supported by spatial analyses of various anthropogenic disturbance sources as indicated above (e.g. wells, roads). These analyses have helped identify habitats that may be attractive to sage-grouse, but ultimately pose an increased risk based on findings from Aldridge and Boyce (2007). Analysis of well sites prioritized each particular disturbance source by the distance to lek, and location relative to nesting, brooding, and winter habitat. The outcome of this analysis is listings of wells in various operational statuses that are specific to companies. The list for each company is prioritized by the potential impacts that reclamation or mitigation may have for sage-grouse. Also summarized are the attributes of habitat and disturbances at various extents from leks to allow for an assessment of leks in regards to recovery goals. The combination of these two products provides guidance for priority reclamation and habitat improvement in relation to sage-grouse augmentation.

Reclamation and restoration activities in the recovery area
Given the limited distribution of critical habitat, reclamation and restoration of plant communities in strategic locations should have a positive impact on sage-grouse, hopefully increasing recruitment rates to reflect an increasing or stable population. Restoration activities will not only restore silver sagebrush communities to standards that are compatible with sage-grouse requirements, but in many cases will eliminate secondary disturbances that are responsible for the reduced effectiveness of habitats. Fish and Wildlife staff in Alberta have been, and continue to meet with public land managers and industry in an effort to increase the effectiveness of habitat for sage-grouse. Management will create landscape priorities that are risk based to limit or remove the potential of development based on habitat importance. These meetings will also negotiate land use standards that reduce physical and behavioral loss of habitat while reclamation activities create net gains in the overall quantity of effective habitat. The approach taken will seek to address the operating standards of companies, the development of new infrastructure, and the reclamation or clean-up of existing infrastructure. Gains made in each of these areas will have direct and positive impacts on sage-grouse reproduction.

The adoption of operating standards for new developments are being negotiated with the Alberta Petroleum Industry based on the best available information including published studies and management precedence regarding key development infrastructure and effects on sage-grouse. Based on this information, standards are being proposed for any new development within sage-grouse range. New developments that are permitted will adhere to the existing policy of using existing disturbances (e.g. multi-well pads, common corridors) and will conform to practices that do not appear to impact sage-grouse based on scientific evidence. Existing operational wells are being considered in relation to critical habitat and companies are being encouraged to participate in the recovery of sage-grouse by removing or mitigating infrastructure (e.g. raptor perch proofing, sound reduction), or by changing monitoring to low intensity methods to remove vehicular traffic (e.g. remote telemetry monitoring systems). For infrastructure no longer considered necessary, operators are removing materials and in some cases

reclaiming well sites to approved standards.

Reclamation of abandoned wells may only lead to small increases in habitat but will remove negative stimuli such as heavy machinery traffic. Reclamation will also lead to decreases in infrastructure that support the presence of mesopredators and perching predators that directly prey on sage-grouse (Coates et al. 2008). All of these factors directly relate to sage-grouse survival. Efforts so far have been well received and several meetings with high volume operators during the summer 2009 were considered very successful with operators agreeing to participate and begin to remove extraneous infrastructure. The energy sector is not the only industry that managers are working with in Alberta.

Alberta MultiSAR is a stewardship program directed at assisting agricultural landholders manage landscapes to directly benefit species at risk while allowing operators to maintain a viable operation. In particular, MultiSAR is working to enhance and maintain habitat to satisfy sage-grouse life cycle requirements" by creating net increases in brooding, rearing, and wintering habitats, and achieving appropriate range conditions on existing habitats for sage-grouse (Downey et al. 2008). Activities to achieve these objectives include reseeding previously cultivated lands back to native cover, and manipulating habitat and anthropogenic features to increase the effectiveness of those habitats. Currently, MultiSAR is developing Habitat Conservation Strategies (i.e., grazing and infrastructure plans) for ranches in the recovery area that will manage habitat directly for sage-grouse (Downey et al. 2008).

The Alberta Conservation Association is currently in the process of purchasing up to 4 sections of private land that was important sage-grouse habitat until recent cultivation. The intent is to restore the sage-grouse habitat. Pending finalization of the land purchase, plans are in place to begin restoring native vegetation in the summer of 2011.

3.5.1 Effects of Alternative A: No translocation (No Action)

- Direct Effects: No augmentation of Alberta sage-grouse population. Without augmentation, habitat conservation and restoration efforts will be the primary variable resulting in any changes to the sage-grouse population.

- Indirect Effects: There would be no subsequent changes in sage-grouse populations in silver sagebrush habitats north of the Milk River, including those silver sagebrush habitats in Northern Montana. Additionally, no knowledge would be gained as to the feasibility of augmenting sage-grouse in a silver sagebrush environment.

3.5.2 Effects of Alternative B: The Southern Valley and Phillips Counties Sage-grouse Translocation Alternative (Proposed Action)

- Direct Effects: Habitat protection, conservation, restoration, and potential change to operating standards and protocols for future

energy development will improve the survival of the translocated sage-grouse and overall sage-grouse populations. However, augmentation of the sage-grouse populations would make it difficult to determine if any population changes are due to habitat conservation/restoration efforts or the augmentation itself.

- Indirect Effects: There is increased potential for sage-grouse dispersal and migration between Northern Montana and Alberta; as well as maintaining connectivity between the sage-grouse populations. Habitat improvements in Alberta (stated above) will aid in this connectivity between the sage-grouse populations

3.6 Relevant Resource #4 – Sage-grouse Monitoring and Research effects.

3.6.1 Effects of Alternative A: No translocation (No Action)

- Direct Effects: MFWP resources and field staff as it relates to monitoring sage-grouse populations would not be affected.

- Indirect Effects: By not translocating sage-grouse, no knowledge would be gained regarding the success of translocation protocols, captures, survivorship etc. especially as it relates to potential translocation in MT and elsewhere.

3.6.2 Effects of Alternative B: The Southern Valley and Phillips Counties Sage-grouse Translocation Alternative (Proposed Action)

- Direct Effects: MFWP resources and field staff would need to be redirected from monitoring sage-grouse populations in Region 6, to complete the translocation. A minimum number leks would still need to be completed to monitor sage-grouse population trends (Valley Co. block survey) and address management plans (AHM leks) in Region 6. MFWP staff would continue coordination efforts with Alberta-based staff to monitor the health and population of the translocated grouse. If the pilot tranlocation project is considered successful, MFWP staff would draft the additional environmental assessment for the subsequent translocation efforts for years 2, 3 and 4.

- Indirect Effects: Knowledge would be gained regarding the feasibility of translocating sage-grouse in silver sagebrush habitats, success of translocation protocols, captures, survivorship etc. especially as it relates to potential translocation in MT and elsewhere.

3.7 Cumulative Impacts

Several environmental and human factors influence sage-grouse populations and their habitat. The Northern Montana source population is annually influenced by factors including regulated hunter harvest, natural predation, West Nile virus, and annual

weather fluctuations. Despite these factors, sage-grouse populations have remained stable on the source area, largely due to the maintenance of large expanses of sagebrush habitat and the resiliency of sage-grouse populations. The impact of removing up to 40 sage-grouse is minor in comparison to the above annual factors and has no population level impacts to sage-grouse.

Chapter 4.0: Resource issues considered but eliminated from detailed analysis.

The Montana Environmental Policy Act (MEPA) provides for the identification and elimination from detailed study of issues, which are not significant or which have been covered by a prior environmental review, narrowing the discussion of these issues to a brief presentation of why they will not have a significant effect on the physical or human environment or providing a reference to their coverage elsewhere (ARM 12.2.434(d)). While these resources are important, they were either unaffected or mildly affected by the proposed action, or the affects could be adequately mitigated.

4.1 Vegetation and soils

Capture methods require the use of four-wheel drive vehicles and all terrain vehicles to access sage-grouse leks and at times capture sage-grouse. Due to the timing of the capture in April during the non-growing season, minimal vegetation impacts are expected. In areas where topography, soils, and or vegetation prevent vehicle access, walking methods will be used.

Chapter 5.0: Determination If an Environmental Impact Statement is Required

Based on the above assessment, which has not identified any significant negative impacts from the proposed action, an EIS is not required and an EA is the appropriate level of review. The overall impact from the successful completion of the proposed action would provide long-term benefits to both the physical and human environment.

Chapter 6.0: Public Participation and Collaborators

6.1 Public Involvement

For this EA the public will be notified in the following manners to comment on this EA, the proposed action and alternatives:

- One statewide press release;
- Direct mailings of cover letter and preface to the FWP Commission, and a list of stakeholders comprised of individuals and agencies that may have a particular interest in this proposal.
- Public notice on the Fish, Wildlife & Parks web page: *http://fwp.mt.gov*.

Copies will be available for public review at FWP Region 6 Headquarters in Glasgow.

The public comment period will extend for (31) thirty-one days. Written comments will be accepted until 5:00 p.m. on January 14, 2011 and can be mailed to the address below:

Montana Fish, Wildlife & Parks
Attn: Sage-grouse Translocation
54078 US Hwy 2 W
Glasgow, MT 59230

Or comments can be emailed to jelletson@mt.gov.

Comments can also be made by going to:
http://www.surveymonkey.com/s/RTVVNZM

6.2 Collaborators and scoping

The recent formation of several memorandums of understanding (MOU's) to facilitate inter-agency cooperation and coordination for wildlife and landscape management has signified greater regional, ecosystem-based management in Western North America. While state and provincial agencies maintain ultimate authority over their wildlife resources, recognition is growing that western ecosystems and their species, along with the pressures threatening them, regularly transcend jurisdictional boundaries. As such, management of these species and systems requires substantial collaboration to yield meaningful results. In 2008 the Western Association of Fish and Wildlife Agencies (WAFWA) endorsed a MOU signed by all state/provincial agencies and key federal land management and conservation agencies active in greater sage-grouse (*Centrocercus urophasianus*) conservation. A second western state/province based initiative was formed in 2007 under the Western Governors' Association targeted at maintaining key habitats and corridors. At a regional level, the Northern Sagebrush Steppe Initiative (NSSI) was endorsed by WAFWA in 2007 as a response to regional pressures and shared wildlife resources in the Alberta, Montana, and Saskatchewan border region. In particular these efforts have been focused on maintaining and in some cases increasing current species distributions and populations by conserving and restoring key habitats, including the greater sage-grouse.

Although this project is to be led by Montana Fish, Wildlife and Parks and the Alberta Sustainable Resource Development, the project will be coordinated with local members of the communities, interest groups, and agencies to incorporate comments, issues, and suggestions to the project proposal. Other agencies may include, but not be limited to BLM, DNRC, USFWS, US Customs and Border Protection.

6.2.1 The translocation proposal was presented to the Region 6 sage-grouse working group on November 4, 2010. Comments from that meeting were incorporated into this EA. Present were representatives from the Bureau of Land Management (BLM), Natural Resources Conservation Service

(NRCS), Montana Department and Natural Resources and Conservation (DNRC), and Ranchers Stewardship Alliance (RSA).

6.2.2 Through the development of this draft EA; MFWP, BLM, and ASRD staff were included as reviewers.

6.3 Anticipated Timeline

Public Comment Period on EA: December 14, 2010 – January 14, 2011
Decision Notice Published: January 21, 2011
FWP Commission Decision: February 10, 2011
Proposed Translocation of sage-grouse to Alberta (if applicable): April 2011

Chapter 7.0: EA Preparer(s)

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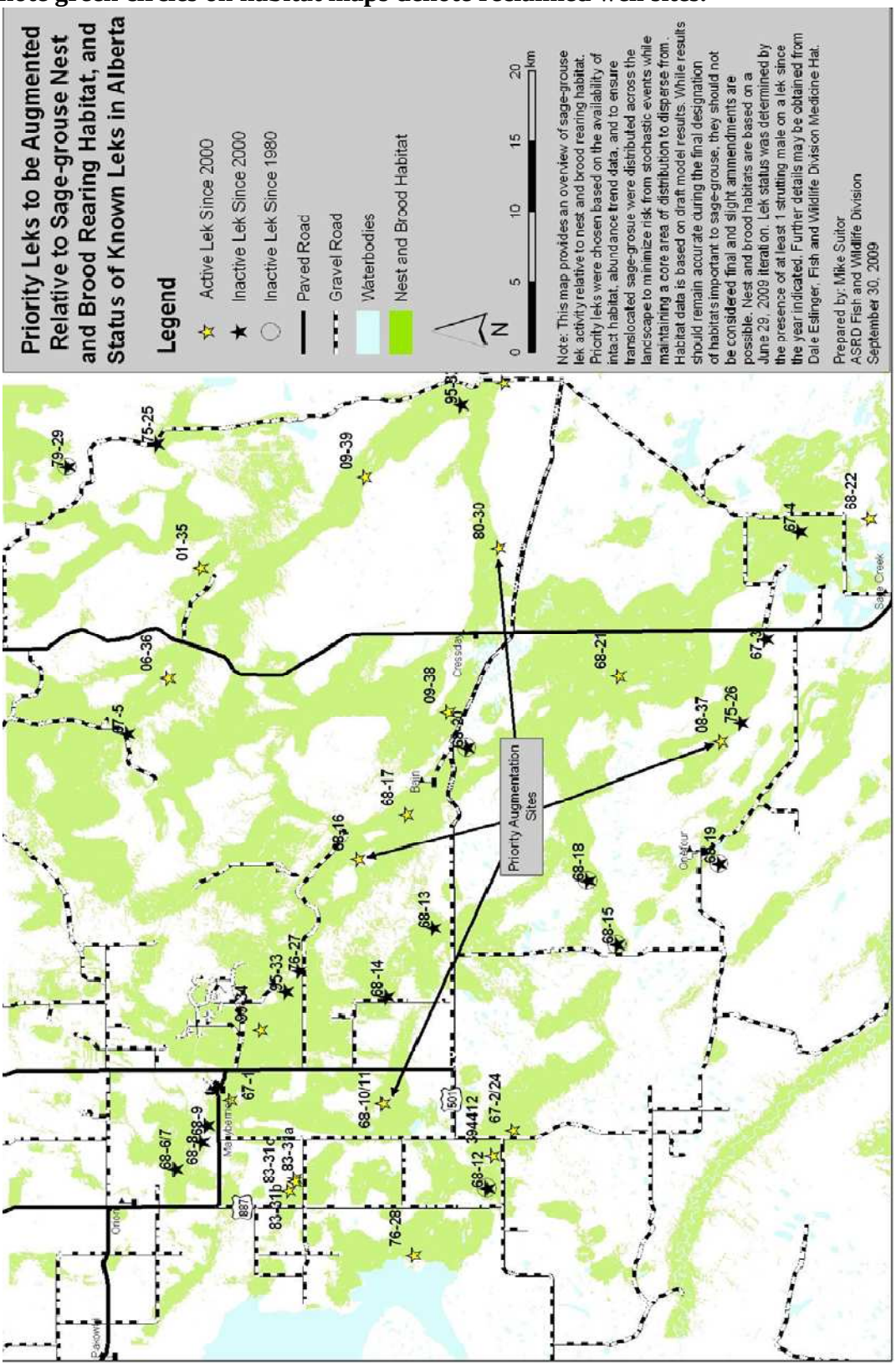
Appendices

Appendix 1 - Table summarizing past, current, and projected threats to sage-grouse in Alberta, including whether management actions can mitigate the threat.

Threat	Historical Decline Factor	Current Decline Factor	Impediment to Recovery	Threat to Translocated Birds	Possible to Mediate	Explanation
Conversion to cropland	Yes	No	~	No	Yes	Possibly the greatest contributor to historical declines although limited in scope in the immediate recovery area. Conversions in northern Montana remain a concern to full recovery as population isolation and thus decreased immigration and genetic flow are likely to occur. Efforts should be made to retain remnant native range corridors.
Water impediments	~	~	No	No	Yes	Techniques to slow runoff have decreased the health of silver sage communities. In areas of targeted restoration it will be technically feasible to address this issue.
Natural disturbances	Yes	Yes	No	Yes	~	Severe weather events (e.g. hail storms, flooding) and cyclical climatic patterns (e.g. drought) can have detrimental effects on populations. Although difficult to manage for catastrophic events, sound range management can buffer the effects of some of these events.
Industrial Activity	~	Yes	~	~	Yes	Oil and gas, wind, and powerline exploration and development create linear disturbances reducing the effectiveness and creating mortality sinks of once source habitat. Current estimates suggest the footprint of oil and gas development has reached a peak. Restoration efforts beginning immediately will be phased in focusing on critical habitats adjacent to recovery leks followed by secondary habitats, and expansion habitat.
Grazing Regime	~	No	No	No	Yes	Current strategies encourage late seral-stage communities favoring residual cover and high litter content. Directed grazing practices could be used to improve sage-grouse habitats by increasing patchiness in some areas.
Predators	~	~	~	~	Yes	Although usually not a directed predator of sage-grouse, coyotes will incidentally predate on adults, juveniles, and nests. Other meso-predators may also impact populations by preying on nests. Predator control has been a part of other reintroduction efforts. Although not currently part of this program, predation will be monitored and results fed into an adaptive management approach.
Pesticides	No	No	No	No	Yes	Pesticide use does not appear to impact this sage-grouse population as their use is minimal in the recovery area.
Recreational Activity	No	No	No	No	Yes	Recreational viewing of active leks when done incorrectly has the potential to cause abandonment of leks. Currently a moratorium on viewing in Alberta has dealt with this issue. Once recovered to goals listed in the recovery plan, viewing opportunities will again be allowed with proper management.
Disease	~	Yes	Yes	Yes	~	West Nile virus has had serious impacts on the recovery area, decreasing female late summer survival by ~25% in one season. Although considered a major threat to this and all sage-grouse populations, some sero-prevalence has been noted.
Other disturbances	No	No	No	No	Yes	Other anthropogenic effects such as the spread of weeds and vehicle strikes may have some impact on the population although this is expected to be minor. Reclamation of access routes in sage-grouse range should increase the effectiveness of habitats.

Appendix 2 - Maps of sage-grouse leks in Alberta to focus augmentation efforts – note green circles on habitat maps denote reclaimed well sites.



Appendix 3 - Capture and handling protocols

Spotlight protocol

1. Use some form of white noise.
2. When approaching a bird on an ATV, drive directly to it, and then begin to veer away as you get within 15 feet or so.
3. Work to do a drive-by and place the bird about 6 feet off the side of the ATV.
4. Trap the bird using hoop net. Focus on hens where possible.
5. Place sage-grouse in box for transport.
6. Fill out form attached to each box including the capture date and time in military (24-hour) format, sex if known, generic description of locations, GPS location in decimal degrees (WGS84), and capture crew.
7. Transport back to central processing facility.

Processing steps at central location

1. In a crew of two, one person will hold the bird (the "handler") and the other will process the bird and fill out the trapping data sheet (the "processer"). Continual communication between the handler and the processor is essential, and will ensure a short and safe handling time. As you get familiar with the processing steps, communicate with each other to plan for the next step in the process.
2. Birds tend to stay much calmer and struggle less when the legs are secured or supported. The best way to do this is to hold both legs in one hand and hold them back toward the tail. Alternatively you can hold the bird so both legs are in contact with your knee.
3. Follow disease and parasite testing protocols including examination by an appropriately certified personnel.
4. Apply the radio transmitter and record the frequency once successfully fitted. The radio should not be able to slip over the bird's head, but should be able to rotate freely around the neck and should be manually preened into the neck feathers. The approximate proper fit will allow you to place the tip of your little finger between the neck and the collar.
5. Apply a plastic tarsal tag. Use the spreading pliers, and always apply the band on the right leg with the letter side down. The band should rotate freely around the leg. Record the tarsal tag number.
6. Apply the metal leg band to the left leg. Males get a large leg band, females get the smaller band. Each band has its own particular applicator pliers. Two squeezes with the pliers are necessary for optimal band closure. First, close the band tightly with the seam of the band aligned with the seam of the pliers when closed. For the second squeeze, turn the band so that the seam is 90° from the seam of the pliers when closed. Squeeze hard, and the band should have a tight butt-end seam. The band will often be slightly stuck in the pliers after the second squeeze – just pull it free with your fingers. Record the metal band number.

7. Record the sex of the bird. If uncertain, examine the undertail coverts. Males have black feathers with white tips, and have a clean break between black and white. Females have similar black feathers with white tips, but will have white streaking along the feather shaft.
8. Record the age of the bird. Examination of the 9th and 10th primaries is the best way to do this. Juvenile primaries will be pointed and often frayed on the trailing edge. Adult's primaries will be much more rounded and smooth.
9. Record the weight in kilograms. To weigh, the handler should rotate the bird so it is head-down, and the handler should expose the left leg with the metal leg band for the processor. The processor signals when he/she has a firm grip on the scale, and the handler signals when the bird is hanging completely free. The processor signals when an accurate weight reading is taken, and holds the scale until the handler has regained control of the bird.
10. Measure tarsus length: using the digital caliper, record the length of the tarsus in millimeters from the front of the "ankle" to the rear of the "elbow." Make sure the foot is fully flexed downward before measuring.
11. Measure head length: hold the head of the bird by the tip of the bill. Open the caliper wide, and place first at the back of the head, directly in the center. Close the caliper until it just touches the tip of the bill. Record length in millimeters.
12. Take a feather sample. If feathers are lost during handling and you are certain that those feathers are from the bird in hand, use several for the sample. Otherwise, grab and pluck 2-3 downy feathers from underneath one wing. Tear the top off a fresh whirl-pak bag and place feather inside. If it is necessary to push the feather further into the bag, use a pen some other implement – do not use your bare fingers. Only one person should touch the feathers, and should have as little contact as possible. With a sharpie, write on the bag the bird's identity number (tarsal tag number followed by metal band number) and the capture date in MM/DD/YY format.
13. Record the time in military format once completed.
14. Throughout the process record the initials of all crew involved in trapping and processing.
15. Record any notes on the condition of the bird, injuries, barb separation, flight irregularities, etc.
16. Place sage-grouse back into box and place in appropriate area for transport.

Appendix 4 – Disease and Parasite Concerns and Testing

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Fish and Wildlife Division
Alberta Sustainable Resource Development

Greater sage-grouse (SAGR) are host to a number of diseases and parasites, many of which are ubiquitous throughout its distribution. West Nile Virus (WNv) is widely considered to be the most significant threat to SAGR populations and recovery efforts. SAGR are highly susceptible to WNv, and data suggests SAGR may not develop immunity to the virus (Naugle et al 2005). The inability to find WNv antibodies implies that the virus likely kills all infected SAGR (Naugle et al 2005). Outbreaks of WNv are highly dependant on mosquito (*Culix tarsalis*) production which is influenced by variations in summer weather conditions. As a result, the impact of WNv on SAGR populations can change from year to year and should be followed closely.

WNv is endemic to southern Alberta, and the Alberta SAGR recovery plans will be proactive in reducing the impact of this virus. This will include establishing new populations at times outside of the infectivity period of WNv (start of July until the end of September) the proactive long term monitoring of new populations and where necessary implementing mosquito control in areas proximate to new lek(s). Our SAGR recovery plan will also perform serology on all captured birds augmenting the current data set regarding WNv immunity in SAGR.

Other parasites and diseases commonly harboured by greater sage-grouse are known to pose a minimal threat at the population level. However, as with most diseases or parasitic infections, these agents may have a considerable role in reducing local, sub population densities. Higher densities of infected sage-grouse may facilitate increased individual parasitic loads, influencing individual morbity/mortality toward a balance between host density and tolerable parasitic loads. It is also important to be aware of the pathogenicity of any disease agent carried by SAGR to other species sharing habitat. With this in mind, disease and parasite testing of SAGR used for this recovery plan will be administered within this context. Given the lack of information regarding diseases and parasites of SAGR between both the capture and introduction areas, this data will provide a valuable baseline, enhancing SAGR recovery efforts.

Several parasitic/disease agents are of particular importance to the success of the Alberta Greater Sage-grouse Recovery Program which will be screened for prior to bird translocation. These agents have been chosen due to their potential to increase morbidity/mortality in both domestic and wild game poultry.

Eimeria angusta (Protozoan)

- *Eimeria angusta* is suggested as being ubitquious throughout known SAGR habitat (Thorne et al. 1982). However, outbreaks caused by concentrations of infected birds near water sites during summer has been known to decimate SAGR populations in several localities; 400 of 2000 sage-grouse died of it in Fremont Co. Wyoming (Wallestad 1975, Simon 1940). With this in mind, screening for this parasite prior to reintroduction and removing/treating infected birds may lessen or remove the potential impact of this parasite to local populations.

Leucocytozoon (Protozoan)

- Leucocytozoon sp., are transmitted to birds via biting black flies. The majority of birds affected with leucocytozoonosis exhibit no clinical signs. Those that are visibly affected show mild to severe signs of anorexia, ataxia, weakness, anemia, emaciation, and have difficulty breathing. Birds may die acutely or experience chronic disease due to rupturing of the developing parasite in different organs (e.g. liver, brain). It is believed that the mortality in adult birds occurs as a result of debilitation and increased susceptibility to a secondary infection.

Plasmodium pediocetti (Protozoan)

- Commonly known as Avian Malaria, this parasite has been correlated with low reproductive success for infected males (Johnson and Boyce, 1991). *P. pediocetti* causes the eruption of erythrocytes in infected birds. In male birds, this constitutes a morbid behavior in male birds, disrupting courtship displays and likely reducing the chances of preferential selection by hens.

Avian Influenza (Virus)

- **Many strains of avian influenza viruses occur naturally in wild birds. Some of these strains can be spread to domestic birds (poultry in particular,especially ducks, chickens and turkeys). Given the risk of this disease to both wild and domestic bird populations all birds translocated into Alberta will be tested for this disease as part of the National Avian Influenza Surveillance Program.**

Chewing Lice

- There are numerous species of chewing lice that may adversely affect SAGR. Under heavy infestations, these parasites will eat skin and feathers, and hematomas created by lice on the air sacs may impede the reproductive success of males (Boyce, 1990). These parasites have a wide distribution and are likely to be ubiquitous through the SAGR range.

To address these concerns, the Alberta Greater Sage-grouse recovery strategy will initiate physical examination and disease testing on all captured birds to be translocated. Any

individuals showing signs consistent with possible infectious disease will not be moved. Furthermore, any bird testing positive for any of the before mentioned parasites will not be moved unless an appropriate treatment can be administered to remove or reduce the parasite load of the individual.

Physical Examination:

Each individual will be weighed at the time of processing and sample collection. Physical examination and external health check will be performed by a certified, licensed veterinarian on all birds including those not sampled. Any birds with abnormalities consistent with possible infectious disease (unexplained poor body condition, evidence of chronic diarrhea, ocular, oral or nasal discharge, sneezing, unexplained lesions or growths) should not be released but, should be held and submitted to a wildlife disease diagnostic lab for complete necropsy. Ideally birds should be submitted to the diagnostic facility alive. If this is not possible we will collect blood and Avian Influenza samples from the birds prior to euthanasia.

Disease and Parasite sampling:

Specific sampling will include:

Fecal

Collect feces from a single individual per tube or small whirl-pak® Bag - submit to participating diagnostic laboratory for parasitological examination

Blood Samples

Blood samples should be collected by a certified veterinarian or someone with extensive experience with the procedure**.**

- Collect 2 ml of blood in small glass red top tube bullet tube if you collect 1 ml or less blood.
- Place tube on its side for 4 hours at room temperature.
- When clot begins to retract, place the tube upright and put in fridge or spin and separate serum.
- Deliver to the participating diagnostic laboratory same day or place in fridge overnight.

Avian Influenza Tests*:*

To collect cloacal swab samples for Avian Influenza testing, hold the bird's head down in a nearly vertical position with wings and feet contained. The bird's ventrum should face the person swabbing. Locate and grasp tail feathers at the base and reflect away from you to locate cloaca. Remove swab from package and insert tip into cloacal orifice (1cm).

Rotate swab tip against cloacal lining two or three times. Remove swab, shake off excess fecal material, and place directly into liquid transport media. With the swab in the media, swirl the stem end of the swab between fingers vigorously, and leave the swab in the tube. When all swabs are in the media, slowly turn and pull all swabs out of the tube at the same time, causing the contents to be expressed into the tube.

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Appendix 5 - State, provincial and federal regulatory requirements for translocating sage-grouse.

ALBERTA, CA

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The Canadian Food Inspection Agency (CFIA) requires that an import permit be obtained for the importation of any live animal, including Greater sage-grouse, from the U.S. This import permit can be obtained by submitting application c5083to Craig Sellars, Import/Export Coordinator (CFIA), fax 403-292-6629. This application should be submitted approximately 4 months prior to the planned import of greater sage-grouse into Alberta. Imported sage-grouse into Canada must be accompanied by a U.S. Origin Health Certificate (VS Form17-6). For sage-grouse translocation to the Alberta Recovery Area, disease testing as indicated on this form has been granted an exemption (Craig Sellars personal communication via email). All translocated sage-grouse must be identified using leg bands. Both a research permit and an import permit will be obtained from the province of Alberta. Dr. Mark Ball will provide the research permit and an import permit from Wildlife Officer Tom Biglin out of the Calgary office will be obtained. No permits will be required from the Canadian Wildlife Service as sage-grouse will not occupy any federal lands in Canada prior to release.

MONTANA, U.S.

Scientific Collector's Permit: Montana Fish Wildlife & Parks requires a scientific collector's permit for all activities related to animal capture and handling, wildlife rehabilitation, bird banding, educational display, wildlife relocation or carcass salvage. In order to acquire the permit by April 1, the permit should be applied for by the end of December 2010.

Research projects that require capture and/or handling of wild animals must comply with the Animal Welfare Act 1966 and its amendments 1970, 1976, 1985, and 1990. An approval of animal capture, handling and care protocols must be provided from an approved Institutional Animal Care and Use Committee (IACUC). Applicants can apply for a review by the MT FWP IACUC committee if one is not available through other means. Capture or handling activities must not begin until an official review has been completed. More information about an MT FWP IACUC review can be found on the FWP website http://fwp.mt.gov/doingBusiness/licenses/wildlifeCollector.html or by contacting MT FWP Veterinarian, Jennifer Ramsey at jramsey@mt.gov.